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(54) FLAME-RETARDANT WATER-REPELLENT SOUND ABSORBING BODY AND METHOD FOR MANUFACTURING THE SAME

(57)Abstract:

PROBLEM TO BE SOLVED: To provide a flame-retardant water repellent sound absorbing body for which glass wool is not used and a method for manufacturing the same.

SOLUTION: This flame-retardant water repellent sound absorbing body is formed by holding hydrophobic particulates of 1 nm to 1 mm in average grain size at a ratio of 0.3 go 20 g/m² on the surface of a foam obtained by foaming and curing an aqueous mixture containing phosphoric acids (a), a foaming agent (b) for the phosphoric acids and a urethane prepolymer (c) having an isocyanate group. This method for manufacturing the flame-retardant water repellent sound absorbing body consists in removing the surface skin of the foam obtained by foaming and curing the aqueous mixture described above and spraying the hydrophobic particulates onto this foam.

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CLAIMS

[Claim(s)]

[Claim 1] A particle with a hydrophobic mean particle diameter of 1nm - 1mm is 0.3 g/m² - 20 g/m² to the front face of foam on which the aqueous mixture which comes to contain the urethane prepolymer (c) which has the foaming agent (b) and isocyanate radical of phosphoric acids (a) and phosphoric acids foamed and hardened, and was obtained. Fire-resistant hydrofuge absorption-of-sound object characterized by coming to be held at a rate.

[Claim 2] The fire-resistant hydrofuge absorption-of-sound object according to claim 1 with which the above-mentioned particle is characterized by a contact angle with water consisting of a base material which is 90 degrees or more.

[Claim 3] The fire-resistant hydrofuge absorption-of-sound object according to claim 1 characterized by the above-mentioned particle being a hydrophobic silica particle which has a low-grade alkyl group on a front face.

[Claim 4] claims 1-3 characterized by to remove the epidermis of the foam which foamed into the aqueous mixture which comes to contain the urethane prepolymer (c) which has the foaming agent (b) and the isocyanate radical of phosphoric acids (a) and phosphoric acids, was made to harden it, and was obtained, and to sprinkle a particle with a hydrophobic mean particle diameter of 1nm - 1mm on said foam — the manufacture approach of a fire-resistant hydrofuge absorption-of-sound object given in any or the 1st term.

[Claim 5] The manufacture approach of the fire-resistant hydrofuge absorption-of-sound object according to claim 4 characterized by removing epidermis after foaming of the above-mentioned aqueous mixture, and before hardening, and sprinkling the above-mentioned particle on the front face of the obtained foam.

[Claim 6] claims 1-3 characterized by sprinkling a particle with a hydrophobic mean particle diameter of 1nm - 1mm in the process paper, foaming into the aqueous mixture which comes to contain the urethane prepolymer (c) which has the foaming agent (b) and isocyanate radical of phosphoric acids (a) and phosphoric acids, and carrying and stiffening it on it — the manufacture approach of a fire-resistant hydrofuge absorption-of-sound object given in any or the 1st term.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the fire-resistant hydrofuge absorption-of-sound object used suitable for undercover one of the circumference of the engine of an automobile etc.

[0002]

[Description of the Prior Art] Conventionally, the thing (refer to JP,58-177781,A) of the shape of a mat which held glass wool in the bag of polyethylene, and the thing which carried out the laminating of the nonwoven fabric to glass wool were used for undercover one of the circumference of the engine of an automobile from points, such as absorption-of-sound nature, adiathermic, and water repellence. However, since glass wool was used, inferior [of the work environment by scattering of a glass fiber] was difficult to avoid.

[0003] The foam by which the brittleness which the aquosity mixture which becomes JP,9-157061,A from the urethane prepolymer (c) which has the foaming agent (b) and isocyanate radical of phosphoric acids (a) and phosphoric acids on the other hand foams and comes to harden has been improved is indicated, and even if this foam does not use glass wool, it is inorganic organic compound foam which has heat insulation absorption-of-sound nature while having about the same fire retardancy as glass wool.

[0004]

[Problem(s) to be Solved by the Invention] However, water repellence was insufficient for using for undercover one the foam indicated by above-mentioned JP,9-157061,A, for example, foam absorbed storm sewage, the water at the time of car washing, the sanitary sewage of the ground which a tire winds up, etc., and there was a problem that adiathermic and absorption-of-sound nature will fall remarkably.

[0005] Although it was possible to have given water repellence to the front face of the above-mentioned compound foam by the approach of carrying out the laminating of the water-repellent nonwoven fabric in order to solve this problem, inviting the new problem of the increase of a process and the increase of cost was not avoided. In addition, the typical sectional view of such water-repellent foam that may be guessed is shown in drawing 2. 3 is inorganic organic compound foam of the open cell structure indicated by JP,9-157061,A, and 4 is the nonwoven fabric by which the laminating was carried out to foam 3.

[0006] This invention solves the trouble of the above-mentioned conventional absorption-of-sound object, and it aims at offering the fire-resistant hydrofuge absorption-of-sound object with which glass wool is not used, and its manufacture approach.

[0007]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, this invention according to claim 1 The aquosity mixture which comes to contain the urethane prepolymer (c) which has the foaming agent (b) and isocyanate radical of phosphoric acids (a) and phosphoric acids foams. To the front face of the foam hardened and obtained, a particle with a hydrophobic mean particle diameter of 1nm - 1mm is 0.3 g/m² - 20 g/m². The fire-resistant hydrofuge absorption-of-sound object which it comes to hold at a rate is offered.

[0008] Moreover, this invention according to claim 2 offers the fire-resistant hydrofuge absorption-of-sound object according to claim 1 with which the above-mentioned particle consists of a base material whose contact angle with water is 90 degrees or more. Moreover, this invention according to claim 3 offers the fire-resistant hydrofuge absorption-of-sound object according to claim 1 whose above-mentioned particle is a hydrophobic silica particle which has a low-grade alkyl group on a front face.

[0009] moreover, claims 1-3 which this invention according to claim 4 removes the epidermis of the foam which foamed into the aqueous mixture which comes to contain the urethane prepolymer (c) which has the foaming agent (b) and the isocyanate radical of phosphoric acids (a) and phosphoric acids, was made to harden it, and was obtained, and sprinkle a particle with a hydrophobic mean particle diameter of 1nm - 1mm on said foam -- any or the 1st term is provided with the manufacture approach of the fire-resistant hydrofuge absorption-of-sound object a publication.

[0010] Moreover, this invention according to claim 5 offers the manufacture approach of the fire-resistant hydrofuge absorption-of-sound object according to claim 4 which removes epidermis after foaming of the above-mentioned aqueous mixture, and before hardening, and sprinkles the above-mentioned particle on the front face of the obtained foam. moreover, claims 1-3 which this invention according to claim 6 sprinkles a particle with a hydrophobic mean particle diameter of 1nm - 1mm in the process paper, carry on it the aqueous mixture which comes to contain the urethane prepolymer (c) which has the foaming agent (b) and isocyanate radical of phosphoric acids (a) and phosphoric acids, and are foamed and stiffened -- any or the 1st term is provided with the manufacture approach of the fire-resistant hydrofuge absorption-of-sound object a publication.

[0011] Hereafter, this invention is further explained to a detail. For the fire-resistant hydrofuge absorption-of-sound object of this invention, to the front face of the foam generated from the aqueous mixture which comes to contain the urethane prepolymer (c) which has the foaming agent (b) and isocyanate radical of phosphoric acids (a) and phosphoric acids, a particle with a hydrophobic mean particle diameter of 1nm - 1mm is 0.3 g/m² - 20 g/m². It is held at a rate.

[0012] Since the foam of this invention is making phosphoric acids (a) contain, it improves brittleness by giving elasticity to the foam of phosphoric acids by the urethane prepolymer (c) which has fire retardancy and has an isocyanate radical. As phosphoric acids (a), a phosphoric acid, phosphorous acid, a phosphoric anhydride, condensed phosphoric acid, these polyvalent metallic salt, etc. are mentioned, and these may be used independently or may be used as two or more sorts of mixture, for example.

[0013] Among this, the first phosphoric-acid polyvalent metallic salt, the second phosphoric-acid polyvalent metallic salt, and the third phosphoric-acid polyvalent metallic salt are mentioned as polyvalent metallic salt of a phosphoric acid. Moreover, as a metal which constitutes the above-mentioned polyvalent metallic salt, magnesium, calcium, aluminum, zinc, barium, iron, etc. are mentioned. The approach of adding in a system separately with the phosphoric acids of a phosphoric acid and phosphorous acid, and making polyvalent metal hydroxides, such as polyvalent metal oxides, such as activity metallic compounds, for example, a magnesium oxide, and a calcium oxide, and an aluminum hydroxide, a magnesium hydroxide, a calcium hydroxide, etc. reacting to the phosphoric acid, the phosphorous acid, and the chemistry target other than the approach of adding in forms, such as these polyvalent metal component, phosphoric-acid polyvalent metallic salt, and phosphorous acid polyvalent metallic salt, within a system can also be taken.

[0014] Although illustrated as phosphoric acids (a), desirable things are a phosphoric acid, the first magnesium phosphate, the first aluminium phosphate, the first phosphoric-acid zinc, and two or more sorts of these compounds inside, and especially desirable things are a phosphoric acid, the first magnesium phosphate, the first aluminium phosphate, and two or more sorts of such mixture. The content of phosphoric acids (a) is usually 3 - 50 % of the weight among all the components of the foam of this invention. If the fire retardancy of the foam from which the content of phosphoric acids is obtained at less than 3 % of the weight is not enough and exceeds 50 % of the weight, the dispersibility of this prepolymer (c) will fall and uniform foaming structure

will no longer be acquired.

[0015] this invention — setting — as the foaming agent of phosphoric acids — the following (b1) — and (b2) it is mentioned.

(b1) As an example of the light metal carbonate compound (b1) which reacts with a carbonate compound (b2) acid or alkali, and generates gas, a sodium carbonate, a sodium hydrogencarbonate, potassium carbonate, an ammonium carbonate, a calcium carbonate, a barium carbonate, basic magnesium carbonate, basic zinc carbonate, etc. are mentioned, and magnesium, aluminum, zinc, etc. are mentioned as an example of the above-mentioned light metal (b2). Although illustrated as this foaming agent (b), a desirable thing is basic magnesium carbonate inside. Although there will be especially no limit if it is the range mixed with the time sufficient as a content of the foaming agent of phosphoric acids of mixing with phosphoric acids, it is the 1 – 200 weight section to the (phosphoric-acids a) 100 weight section preferably.

[0016] In this invention, what is guided as an urethane prepolymer (c) which has an isocyanate radical from the organic poly isocyanate compound (n) and an active hydrogen content compound (h), and has an isocyanate radical in intramolecular is mentioned. As the above-mentioned organic poly isocyanate compound (n), following (n1) – (n5) is mentioned, for example. However, the carbon number displayed in – (n1) (n5) is a value except the carbon number in an isocyanate radical.

[0017] (n1) The denaturation object of the aroma aliphatic series poly isocyanate (n5) (n1) of the aromatic series poly isocyanate (n4) carbon numbers 8–12 of the alicyclic poly isocyanate (n3) carbon numbers 6–20 of the aliphatic series poly isocyanate (n2) carbon numbers 4–15 of carbon numbers 2–12 – (n4) the poly isocyanate [0018] As an example of aliphatic series poly isocyanate (n1), ethylene di-isocyanate, tetramethylene di-isocyanate, hexamethylene di-isocyanate (HDI), dodeca methylene di-isocyanate, 2 and 2, 4-trimethyl hexamethylene di-isocyanate, lysine diisocyanate, 1 and 3, 6-hexamethylene tri-isocyanate, etc. are mentioned. As an example of alicyclic poly isocyanate (n2), isophorone diisocyanate (IPDI), dicyclohexyl methane –4, 4'-diisocyanate (hydrogenation MDI), 1, 4-cyclohexane diisocyanate, methylcyclohexane –2, 4-diisocyanate (hydrogenation TDI), 1, and 4-screw (2 isocyanate ethyl) cyclohexane etc. is mentioned.

[0019] as the example of aromatic series poly isocyanate (n4) — 1, 4-phenylene diisocyanate, 2, and 4- or 2,6-toluene diisocyanate (TDI), diphenylmethane –2, 4'-, or 4 and 4 – diisocyanate (MDI), naphthalene –1, 5-diisocyanate, and '3, 3' – dimethyl diphenylmethane –4 and 4' – diisocyanate, poor quality TDI, polyphenyl methane poly isocyanate, etc. are mentioned. As an example of aroma aliphatic series poly isocyanate (n3), p-xylylene diisocyanate, tetramethyl xylene G SOSHINETO, etc. are mentioned.

[0020] (n1) Instead of the isocyanate radical of the poly isocyanate illustrated above as – (n1) (n4) as an example of the denaturation object (n5) of the poly isocyanate of – (n4), the denaturation object which introduced a carbon amide group, a URECHI dione radical, a URETO imino group, the urea radical, the view ITTO radical, the isocyanurate radical, the urethane group, etc. is mentioned. There is especially no limitation in selection of these organic poly isocyanate compound (n), and it can double with the physical properties according to an operating condition and a part, and can be chosen as arbitration.

[0021] As the above-mentioned active hydrogen content compound (h), following (h1) – (h12) is mentioned, for example.

(h1) An aliphatic series dihydric alcohol (h2) annular radical The low-molecular diols which it has Trihydric alcohol (h3) The polyhydric alcohol of four or more organic functions (h4) Alkanolamines (h5) The ethyleneoxide of the compound of – (h5) (h6) (h1) And/ Or low mol addition product (h7) polyoxyalkylene polyol (h8) polyester polyol (h9) polyolefine polyol (h10) acrylic polyol (h11) castor oil system polyol (h12) polymer polyol [0022] of propylene oxide What was obtained by acrylic nitril, styrene, etc. carrying out the polymerization of the ethylenic unsaturated monomer of a publication to U.S. Pat. No. 3383351 in the amount polyol of giant molecules illustrated to – (h7) (h11) as polymer polyol here is mentioned. Moreover, – (h12) may be used by the above (h1) and independent, and an active hydrogen content compound (h) may combine it suitably.

[0023] In this invention, the NCO content in the above-mentioned prepolymer (c) is 0.5 – 30 % of the weight preferably. Moreover, an urethane prepolymer (c) is liquefied in ordinary temperature, and 1,000–50,000 are [molecular weight] desirable. This prepolymer (c) mixes for example, the organic poly isocyanate (n) and an active hydrogen inclusion (h), and is manufactured by making it react at 50–120 degrees C.

[0024] The loadings of the urethane prepolymer in the foam of this invention (c) have 5 – 20 desirable % of the weight to the solid content of the foaming agent (b) of the above-mentioned phosphoric acids (a) and phosphoric acids. At less than 5 % of the weight, foam is too weak to use it, and if 20 % of the weight is exceeded, the fire-resistant engine performance will become inadequate. In order that it may give still higher fire retardancy, it may foam to a flame retarder and may make a component add and harden it, although the foam of this invention can give quite high fire retardancy if the loadings of the above (c) are made into the desirable range.

[0025] As a flame retarder, non-halogen phosphoric ester, halogen content phosphoric ester, an active hydrogen content flame retarder, an antimony trioxide, antimony pentoxide, and a zinc oxide are mentioned, and a kind or two sorts or more may be used. The amount of the flame retarder used is usually below 40 weight sections to the (Prepolymer c) 100 weight section.

[0026] In this invention, the foam which contained the fire-resistant component very so much can be obtained by foaming for the component which consists of water the foaming agent (b) of phosphoric acids (a) and phosphoric acids, an urethane prepolymer (c), and if needed, and mixing and stiffening it. Moreover, a catalyst may be added in order to control the cure rate of the above-mentioned prepolymer (c) by this invention.

[0027] As a catalyst, dibutyltin dilaurate, an alkyl titanate, an organic silicon titanate, Stannous octoate, lead octylate, octylic acid zinc, an octylic acid bismuth, A dibutyl tin JIORUSO phenyl FENOKI site, tin oxide, and metal system catalysts, such as a resultant of ester compounds (dioctyl phthalate etc.), Monoamines and diamines (triethylamine etc.) (N, N, N', N'-tetramethylethylenediamine, etc.) Amines (triethylenediamine etc.) system catalysts, such as triamine (N, N, n', n''-pentamethyl diethylenetriamine, etc.) and annular amines, etc. are mentioned.

[0028] A catalyst may use together a metal system and an amine system independent or a metal system, and an amine system. The loadings of a catalyst are usually 0.001 – 5 weight section preferably below 10 weight sections to the (Prepolymer c) 100 weight section.

[0029] In this invention, in order to control the cellular structure of foam, a foam stabilizer may be added. The silicon system surfactant of the conventional known is mentioned as a foam stabilizer, and the addition is usually 0.001 – 1 weight section preferably below 3 weight sections to this prepolymer 100 weight section.

[0030] When the front face was hydrophobicity, it was sufficient for the hydrophobic particle used in this invention, even if the interior is a hydrophilic property, the hydrophobic ingredient has covered the front face, consequently a front face may show hydrophobicity. Since the water repellence over fine waterdrop will fall if a contact angle will become small if it becomes small, and it becomes large, the mean particle diameter of a hydrophobic particle is limited to 1nm – 1mm. The particle which a contact angle with water becomes from the base material which is 90 degrees or more as a desirable example of the above-mentioned particle, the particle which has a low-grade alkyl group etc. on a front face are mentioned. As a base material whose contact angle with the above-mentioned water is 90 degrees or more, polyethylene, polypropylene, and graphite fluoride, fluorine-containing resin, the ORGANO siloxane, etc. are mentioned, for example.

[0031] As the above-mentioned fluorine-containing resin, for example Tetrafluoroethylene, hexafluoropropylene, Perfluoro vinyl ether, the perfluoro allyl compound ether (perfluoro methyl ether etc.), the homopolymer (polytetrafluoroethylene —) of fluorine content polymerization nature monomers, such as a perfluoro propylene and vinylidene fluoride a PORUBINIRIDEN full ora — those copolymers (a poly vinylidene fluoride-polytetrafluoroethylene-perfluoro propylene copolymer —), such as id the parts, such as a vinylidene fluoride-hexafluoropropylene-tetrafluoroethylene copolymer, — denaturation articles (ethylene or a propylene denaturation article of said polymer etc.) etc. are mentioned.

[0032] If the contact angle of the above-mentioned base material and water becomes small, since the direction of the force which gets wet from the water-repellent force and is going to enlarge a front face becomes large and water repellence will not improve, the contact angle with water has desirable 90 degrees or more. The hydrophobic silica particle which a methyl group and the inorganic or organic particle which, in addition to this, has alkyl group or alkyl group fluoride are mentioned, for example to a front face, and has low-grade alkyl groups, such as a methyl group and an ethyl group, especially on a front face as a particle which has a low-grade alkyl group etc. on the above-mentioned front face is suitable.

[0033] As the above-mentioned hydrophobic silica particle, it is AEROSIL, for example. R972D (Japanese Aerosil), Nipsil SS-50 and Nipsil As for what is generally marketed, SS-30S (Japanese silica industrial company) etc. are usable. The above-mentioned particle may be used independently and may be used together two or more sorts.

[0034] The amount in which the above-mentioned particle is held on the front face of the above-mentioned foam is 0.3 g/m² - 20 g/m². It is carried out. 0.3 g/m² It is because absorption-of-sound nature will worsen if sufficient water repellence cannot be acquired if few, but 20 g/m² is exceeded.

[0035] The epidermis of the foam which foamed into the aqueous mixture which consists of an urethane prepolymer (c) which has the foaming agent (b) and isocyanate radical of phosphoric acids (a) and phosphoric acids as the manufacture approach of the fire-resistant hydrofuge absorption-of-sound object of this invention, was made to harden it, and was obtained is removed, and the approach of sprinkling the above-mentioned particle on said foam is mentioned. Here, the reason for removing epidermis is that an acoustic absorptivity will serve as foam which does not become high if epidermis exists. Furthermore, as the manufacture approach of the fire-resistant hydrofuge absorption-of-sound object of this invention, epidermis is removed after foaming of the above-mentioned aqueous mixture, and before hardening, and the approach of sprinkling the above-mentioned particle is shown in the front face of the obtained foam.

[0036] Even if epidermis is formed and the foam which foamed into the above-mentioned aqueous mixture, was made to harden it, and was obtained usually removes this epidermis, the adhesive strength of that exposure does not change, but if epidermis is removed before hardening, the foam which has an adhesive property in an exposure will be obtained. Namely, in this invention, as for the above "hardening", the interior of foam shall say the phase where the reaction by each raw material advanced to extent which does not have adhesive strength substantially. In the phase of initial foaming, even if epidermis is formed, the interior of foam has an adhesive property and may not have resulted in "hardening."

[0037] If epidermis is removed after foaming of the above-mentioned aqueous mixture, and before hardening, since the high urethane prepolymer of adhesive strength exists in a front face, foam with more high the adhesive strength and holding power of a particle and foam is obtained, and it is convenient.

[0038] The typical sectional view of the fire-resistant hydrofuge absorption-of-sound object according to claim 1 acquired by the manufacture approach according to claim 4 by drawing 1 is shown. 1 is a hydrophobic particle with a mean particle diameter of 1nm - 1mm, and after 2 foams into the aqueous mixture which comes to contain the urethane prepolymer (c) which has the foaming agent (b) and isocyanate radical of the above-mentioned phosphoric acids (a) and phosphoric acids and stiffens it, it is urethane system foam of the open cell structure which removed epidermis and was acquired. urethane system foam 2 — combination of the above-mentioned indispensable raw material (a), (b), and (c) — suitably — ** — since it has open cell structure and the amount maintenance of specification of the hydrophobic above-mentioned particle is carried out on the front face by carrying out, it has fire retardancy, water repellence, and absorption-of-sound nature.

[0039] The fire-resistant hydrofuge absorption-of-sound object of this invention can also be manufactured by sprinkling the above-mentioned particle in the process paper, foaming into the aqueous mixture which comes to contain the urethane prepolymer (c) which has the foaming agent (b) and isocyanate radical of phosphoric acids (a) and phosphoric acids, and on the other

hand, carrying and stiffening it on it.

[0040] Although, as for this, the top face of foam can do epidermis by foam breaking and the Ayr omission, since the Ayr omission is prevented in process paper, the inferior surface of tongue uses that epidermis is not made. In addition, after an unreacted urethane prepolymer and the above-mentioned particle contact, the foam of high this invention of holding power to a particle is obtained by foaming and hardening. If the process paper in this invention is a thing on the sheet which can release foam from mold, there is especially no constraint of the quality of the material, and it can choose suitably paper, a nonwoven fabric, plastic film, a metal plate, etc.

[0041] (Operation) Since the fire-resistant hydrofuge absorption-of-sound object of this invention has the absorption-of-sound nature originating in an open cell and is carrying out the amount maintenance of specification of the hydrophobic specific particle while it is fire retardancy, since the aquosity mixture which comes to contain the urethane prepolymer (c) which has the foaming agent (b) and isocyanate radical of the above-mentioned phosphoric acids (a) and phosphoric acids foams and hardens and is obtained, it also has water repellence.

[0042] According to the approach according to claim 4 of removing the epidermis of the foam which foamed into the above-mentioned aquosity mixture, was made to harden it, and was obtained especially, and sprinkling the particle of the hydrophobic diameter of specification on the amount foam of specification While obtaining high absorption-of-sound nature by removing the epidermis of foam, offer of the foam which forming the detailed irregularity by the particle in the surface of foam and the hydrophobicity of the particle equipped with the water repellence like the leaf of a lotus conjointly is possible.

[0043] Furthermore, according to the approach according to claim 4 of removing epidermis after foaming of the above-mentioned aquosity mixture, and before hardening, and sprinkling the above-mentioned particle on the front face of the obtained foam, a particle can manufacture the fire-resistant hydrofuge absorption-of-sound object held by higher holding power.

[0044]

[Example] (Example 1) 90 degrees C of polyoxyethylene polyoxypropylene glycol (molecular-weight 2188, 20 % of the weight [of ethyleneoxides] and 80 % of the weight [of pro KIREN oxide] block-copolymer, Sanyo Chemical Industries (stock) make, trade name:new pole PE-62) 420 weight sections were made to react for 5 hours to the MDI(BASF make: trade name RUPURANETO MI) 100 weight section using a reaction vessel, and the urethane prepolymer C1 was created. The isocyanate radical content was number average molecular weight 1345 6.2% of the weight.

[0045] Next, after agitating the phosphoric-acid 890 section and the tap water 836 section to homogeneity using a homomixer, the urethane prepolymer C1,100 weight section was supplied to the same homomixer, and was agitated well. Next, the basic-magnesium-carbonate 175 section was added as a foaming agent, and it agitated further, and it slushes into shuttering (15x15x10cm), free foaming was carried out, and foam was obtained. 1cm of epidermis parts of this foam was cut, and 0.06 g (equivalent to 2.67 g/m²) hydrophobic Aerosil (product R972 made from Japanese Aerosil) was sprinkled to homogeneity on it.

[0046] Water repellence trickled waterdrop into foam and viewing estimated whether waterdrop would roll and fall. Acoustic wave absorptivity ability is JIS. The normal incidence sound absorption coefficient (2000HZ) of A1405 estimated. About fire-resistant evaluation, it carried out based on the surface test method specified by the Ministry of Construction notification No. 1231. The result was shown in Table 1.

[0047] (Example 2) After agitating the phosphoric-acid 890 section and the tap water 836 section to homogeneity using a homomixer, it was easy to supply the urethane prepolymer C1,100 weight section created in the example 1 to the same homomixer, and it was agitated. Next, the basic-magnesium-carbonate 175 section was added as a foaming agent, and it agitated further, and slushed into shuttering (15x15x10cm), and 1cm of epidermis parts of this foam was cut in the place which initial foaming completed (after about 30 seconds). Then, 0.06 g (equivalent to 2.67 g/m²) hydrophobic Aerosil (product R972 made from Japanese Aerosil) was sprinkled to homogeneity on it.

[0048] Water repellence trickled waterdrop into foam and viewing estimated whether waterdrop

would roll and fall. Acoustic wave absorptivity ability is JIS. The normal incidence sound absorption coefficient (2000HZ) of A1405 estimated. About fire-resistant evaluation, it carried out based on the surface test method specified by the Ministry of Construction notification No. 1231. A result is shown in Table 1.

[0049] (Example 3) After agitating the phosphoric-acid 890 section and the tap water 836 section to homogeneity using a homomixer, it is easy to supply the urethane prepolymer C1,100 weight section created in the example 1 to the same homomixer, and it is agitated. Next, this foaming agent basic-magnesium-carbonate 175 section was added, and it agitated further, and it free-foamed, the release paper (30x30cm) which sprinkled 0.12 g (equivalent to 2.67 g/m²) hydrophobic Aerosil (product R972 made from Japanese Aerosil) to homogeneity at the pars basilaris ossis occipitalis was stiffened [it flowed down and], and foam was obtained.

[0050] Water repellence trickled waterdrop into foam and viewing estimated whether waterdrop would roll and fall. Acoustic wave absorptivity ability is JIS. The normal incidence sound absorption coefficient (2000HZ) of A1405 estimated. About fire-resistant evaluation, it carried out based on the surface test method specified by the Ministry of Construction notification No. 1231. A result is shown in Table 1.

[0051] (Example 1 of a comparison) After agitating the phosphoric-acid 890 section and the tap water 836 section to homogeneity using a homomixer, it is easy to supply the urethane prepolymer C1,100 weight section created in the example 1 to the same homomixer, and it is agitated. Next, this foaming agent basic-magnesium-carbonate 175 section was added, and it agitated further, and it slushes into shuttering (15x15x10cm), free foaming was carried out, and foam was obtained. The epidermis part of this foam was cut 1cm, and the same evaluation as an example 1 was performed.

[0052] (Example 2 of a comparison) After agitating the phosphoric-acid 890 section and the tap water 836 section to homogeneity using a homomixer, it is easy to supply the urethane prepolymer C1,100 weight section created in the example 1 to the same homomixer, and it is agitated. Next, this foaming agent basic-magnesium-carbonate 175 section was added, and it agitated further, and slushed into shuttering (15x15x10cm), and 1cm of epidermis parts of this foam was cut, and 0.6 g (equivalent to 26.6 g/m²) hydrophobic Aerosil (product R972 made from Japanese Aerosil) was sprinkled to homogeneity on it in the place which initial foaming completed (after about 30 seconds).

[0053] Water repellence trickled waterdrop into foam and viewing estimated whether waterdrop would roll and fall. Acoustic wave absorptivity ability is JIS. The normal incidence sound absorption coefficient (2000HZ) of A1405 estimated. About fire-resistant evaluation, it carried out based on the surface test method specified by the Ministry of Construction notification No. 1231. A result is shown in Table 1.

[0054] (Example 3 of a comparison) After agitating the phosphoric-acid 890 section and the tap water 836 section to homogeneity using a homomixer, it is easy to supply the urethane prepolymer C1,100 weight section created in the example 1 to the same homomixer, and it is agitated. Next, this foaming agent basic-magnesium-carbonate 175 section was added, and it agitated further, and slushed into shuttering (15x15x10cm), and 1cm of epidermis parts of this foam was cut, and 0.005 g (equivalent to 0.2g/m²) hydrophobic Aerosil (product R972 made from Japanese Aerosil) was sprinkled to homogeneity on it in the place which initial foaming completed (after about 30 seconds).

[0055] Water repellence trickled waterdrop into foam and viewing estimated whether waterdrop would roll and fall. Acoustic wave absorptivity ability is JIS. The normal incidence sound absorption coefficient (2000HZ) of A1405 estimated. About fire-resistant evaluation, it carried out based on the surface test method specified by the Ministry of Construction notification No. 1231. A result is shown in Table 1.

[0056]

[Table 1]

	撥水性*	難燃性	吸音率(2000HZ)
実施例 1	○	準不燃	0. 8
実施例 2	○	準不燃	0. 8
実施例 3	○	準不燃	0. 8
比較例 1	×	準不燃	0. 8
比較例 2	○	準不燃	0. 6 8
比較例 3	△	準不燃	0. 8

*○は転がり落ちたことを示す。

△は少し水滴をはじくが転がり落ちなかったことを示す。

×は発泡体に水滴が吸収されたことを示す。

[0057]

[Effect of the Invention] By constituting the fire-resistant hydrofuge absorption-of-sound object of this invention as above-mentioned, although the glass fiber is not used, it has fire retardancy, absorption-of-sound nature, and water repellence, for example, it can provide suitable for undercover one of the circumference of the engine of an automobile etc. When the above-mentioned particle consists of a base material whose contact angle with water is 90 degrees or more, a water-repellent fire-resistant high hydrofuge absorption-of-sound object can be offered more. When the above-mentioned particle is a hydrophobic silica particle which has a low-grade alkyl group on a front face, a fire-resistant hydrofuge absorption-of-sound object can be offered more cheaply.

[0058] Moreover, the fire-resistant hydrofuge absorption-of-sound object of this invention is constituted as above-mentioned, and it foams into the aqueous mixture which comes to contain the urethane prepolymer (c) which has the foaming agent (b) and isocyanate radical of phosphoric acids (a) and phosphoric acids. A fire-resistant hydrofuge absorption-of-sound object can be manufactured easily, without inviting the new problem of the increase of a process, and the increase of cost, without using a glass fiber by removing the epidermis of the foam which was stiffened and was obtained and sprinkling the particle of the hydrophobic diameter of specification on the amount foam of specification.

[0059] According to the approach of removing epidermis after foaming of the above-mentioned aqueous mixture, and before hardening, and sprinkling the above-mentioned particle on the front face of the obtained foam, a particle can manufacture the fire-resistant hydrofuge absorption-of-sound object held by higher holding power. Furthermore, the hydrophobic above-mentioned particle is sprinkled in the process paper, according to the approach of foaming into the above-mentioned aqueous mixture, and carrying and stiffening it on it, scattering of a particle is prevented and a fire-resistant hydrofuge absorption-of-sound object can be manufactured.

[Translation done.]

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TECHNICAL FIELD

[Field of the Invention] This invention relates to the fire-resistant hydrofuge absorption-of-sound object used suitable for undercover one of the circumference of the engine of an automobile etc.

[Translation done.]

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PRIOR ART

[Description of the Prior Art] Conventionally, the thing (refer to JP,58-177781,A) of the shape of a mat which held glass wool in the bag of polyethylene, and the thing which carried out the laminating of the nonwoven fabric to glass wool were used for undercover one of the circumference of the engine of an automobile from points, such as absorption-of-sound nature, adiathermic, and water repellence. However, since glass wool was used, inferior [of the work environment by scattering of a glass fiber] was difficult to avoid.

[0003] The foam by which the brittleness which the aquosity mixture which becomes JP,9-157061,A from the urethane prepolymer (c) which has the foaming agent (b) and isocyanate radical of phosphoric acids (a) and phosphoric acids on the other hand foams and comes to harden has been improved is indicated, and even if this foam does not use glass wool, it is inorganic organic compound foam which has heat insulation absorption-of-sound nature while having about the same fire retardancy as glass wool.

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EFFECT OF THE INVENTION

[Effect of the Invention] By constituting the fire-resistant hydrofuge absorption-of-sound object of this invention as above-mentioned, although the glass fiber is not used, it has fire retardancy, absorption-of-sound nature, and water repellence, for example, it can provide suitable for undercover one of the circumference of the engine of an automobile etc. When the above-mentioned particle consists of a base material whose contact angle with water is 90 degrees or more, a water-repellent fire-resistant high hydrofuge absorption-of-sound object can be offered more. When the above-mentioned particle is a hydrophobic silica particle which has a low-grade alkyl group on a front face, a fire-resistant hydrofuge absorption-of-sound object can be offered more cheaply.

[0058] Moreover, the fire-resistant hydrofuge absorption-of-sound object of this invention is constituted as above-mentioned, and it foams into the aqueous mixture which comes to contain the urethane prepolymer (c) which has the foaming agent (b) and isocyanate radical of phosphoric acids (a) and phosphoric acids. A fire-resistant hydrofuge absorption-of-sound object can be manufactured easily, without inviting the new problem of the increase of a process, and the increase of cost, without using a glass fiber by removing the epidermis of the foam which was stiffened and was obtained and sprinkling the particle of the hydrophobic diameter of specification on the amount foam of specification.

[0059] According to the approach of removing epidermis after foaming of the above-mentioned aqueous mixture, and before hardening, and sprinkling the above-mentioned particle on the front face of the obtained foam, a particle can manufacture the fire-resistant hydrofuge absorption-of-sound object held by higher holding power. Furthermore, the hydrophobic above-mentioned particle is sprinkled in the process paper, according to the approach of foaming into the above-mentioned aqueous mixture, and carrying and stiffening it on it, scattering of a particle is prevented and a fire-resistant hydrofuge absorption-of-sound object can be manufactured.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, water repellence was insufficient for using for undercover one the foam indicated by above-mentioned JP,9-157061,A, for example, foam absorbed storm sewage, the water at the time of car washing, the sanitary sewage of the ground which a tire winds up, etc., and there was a problem that adiathermic and absorption-of-sound nature will fall remarkably.

[0005] Although it was possible to have given water repellence to the front face of the above-mentioned compound foam by the approach of carrying out the laminating of the water-repellent nonwoven fabric in order to solve this problem, inviting the new problem of the increase of a process and the increase of cost was not avoided. In addition, the typical sectional view of such water-repellent foam that may be guessed is shown in drawing 2. 3 is inorganic organic compound foam of the open cell structure indicated by JP,9-157061,A, and 4 is the nonwoven fabric by which the laminating was carried out to foam 3.

[0006] This invention solves the trouble of the above-mentioned conventional absorption-of-sound object, and it aims at offering the fire-resistant hydrofuge absorption-of-sound object with which glass wool is not used, and its manufacture approach.

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MEANS

[Means for Solving the Problem] In order to attain the above-mentioned purpose, this invention according to claim 1 The aqueous mixture which comes to contain the urethane prepolymer (c) which has the foaming agent (b) and isocyanate radical of phosphoric acids (a) and phosphoric acids foams. To the front face of the foam hardened and obtained, a particle with a hydrophobic mean particle diameter of 1nm - 1mm is 0.3 g/m² - 20 g/m². The fire-resistant hydrofuge absorption-of-sound object which it comes to hold at a rate is offered.

[0008] Moreover, this invention according to claim 2 offers the fire-resistant hydrofuge absorption-of-sound object according to claim 1 with which the above-mentioned particle consists of a base material whose contact angle with water is 90 degrees or more. Moreover, this invention according to claim 3 offers the fire-resistant hydrofuge absorption-of-sound object according to claim 1 whose above-mentioned particle is a hydrophobic silica particle which has a low-grade alkyl group on a front face.

[0009] moreover, claims 1-3 which this invention according to claim 4 removes the epidermis of the foam which foamed into the aqueous mixture which comes to contain the urethane prepolymer (c) which has the foaming agent (b) and the isocyanate radical of phosphoric acids (a) and phosphoric acids, was made to harden it, and was obtained, and sprinkle a particle with a hydrophobic mean particle diameter of 1nm - 1mm on said foam — any or the 1st term is provided with the manufacture approach of the fire-resistant hydrofuge absorption-of-sound object a publication.

[0010] Moreover, this invention according to claim 5 offers the manufacture approach of the fire-resistant hydrofuge absorption-of-sound object according to claim 4 which removes epidermis after foaming of the above-mentioned aqueous mixture, and before hardening, and sprinkles the above-mentioned particle on the front face of the obtained foam. moreover, claims 1-3 which this invention according to claim 6 sprinkles a particle with a hydrophobic mean particle diameter of 1nm - 1mm in the process paper, carry on it the aqueous mixture which comes to contain the urethane prepolymer (c) which has the foaming agent (b) and isocyanate radical of phosphoric acids (a) and phosphoric acids, and are foamed and stiffened — any or the 1st term is provided with the manufacture approach of the fire-resistant hydrofuge absorption-of-sound object a publication.

[0011] Hereafter, this invention is further explained to a detail. For the fire-resistant hydrofuge absorption-of-sound object of this invention, to the front face of the foam generated from the aqueous mixture which comes to contain the urethane prepolymer (c) which has the foaming agent (b) and isocyanate radical of phosphoric acids (a) and phosphoric acids, a particle with a hydrophobic mean particle diameter of 1nm - 1mm is 0.3 g/m² - 20 g/m². It is held at a rate.

[0012] Since the foam of this invention is making phosphoric acids (a) contain, it improves brittleness by giving elasticity to the foam of phosphoric acids by the urethane prepolymer (c) which has fire retardancy and has an isocyanate radical. As phosphoric acids (a), a phosphoric acid, phosphorous acid, a phosphoric anhydride, condensed phosphoric acid, these polyvalent metallic salt, etc. are mentioned, and these may be used independently or may be used as two or more sorts of mixture, for example.

[0013] Among this, the first phosphoric-acid polyvalent metallic salt, the second phosphoric-acid

polyvalent metallic salt, and the third phosphoric-acid polyvalent metallic salt are mentioned as polyvalent metallic salt of a phosphoric acid. Moreover, as a metal which constitutes the above-mentioned polyvalent metallic salt, magnesium, calcium, aluminum, zinc, barium, iron, etc. are mentioned. The approach of adding in a system separately with the phosphoric acids of a phosphoric acid and phosphorous acid, and making polyvalent metal hydroxides, such as polyvalent metal oxides, such as activity metallic compounds, for example, a magnesium oxide, and a calcium oxide, and an aluminum hydroxide, a magnesium hydroxide, a calcium hydroxide, etc. reacting to the phosphoric acid, the phosphorous acid, and the chemistry target other than the approach of adding in forms, such as these polyvalent metal component, phosphoric-acid polyvalent metallic salt, and phosphorous acid polyvalent metallic salt, within a system can also be taken.

[0014] Although illustrated as phosphoric acids (a), desirable things are a phosphoric acid, the first magnesium phosphate, the first aluminium phosphate, the first phosphoric-acid zinc, and two or more sorts of these compounds inside, and especially desirable things are a phosphoric acid, the first magnesium phosphate, the first aluminium phosphate, and two or more sorts of such mixture. The content of phosphoric acids (a) is usually 3 - 50 % of the weight among all the components of the foam of this invention. If the fire retardancy of the foam from which the content of phosphoric acids is obtained at less than 3 % of the weight is not enough and exceeds 50 % of the weight, the dispersibility of this prepolymer (c) will fall and uniform foaming structure will no longer be acquired.

[0015] this invention — setting — as the foaming agent of phosphoric acids — the following (b1) — and (b2) it is mentioned.

(b1) As an example of the light metal carbonate compound (b1) which reacts with a carbonate compound (b2) acid or alkali, and generates gas, a sodium carbonate, a sodium hydrogencarbonate, potassium carbonate, an ammonium carbonate, a calcium carbonate, a barium carbonate, basic magnesium carbonate, basic zinc carbonate, etc. are mentioned, and magnesium, aluminum, zinc, etc. are mentioned as an example of the above-mentioned light metal (b2). Although illustrated as this foaming agent (b), a desirable thing is basic magnesium carbonate inside. Although there will be especially no limit if it is the range mixed with the time sufficient as a content of the foaming agent of phosphoric acids of mixing with phosphoric acids, it is the 1 - 200 weight section to the (phosphoric-acids a) 100 weight section preferably.

[0016] In this invention, what is guided as an urethane prepolymer (c) which has an isocyanate radical from the organic poly isocyanate compound (n) and an active hydrogen content compound (h), and has an isocyanate radical in intramolecular is mentioned. As the above-mentioned organic poly isocyanate compound (n), following (n1) - (n5) is mentioned, for example. However, the carbon number displayed in - (n1) (n5) is a value except the carbon number in an isocyanate radical.

[0017] (n1) The denaturation object of the aroma aliphatic series poly isocyanate (n5) (n1) of the aromatic series poly isocyanate (n4) carbon numbers 8-12 of the alicyclic poly isocyanate (n3) carbon numbers 6-20 of the aliphatic series poly isocyanate (n2) carbon numbers 4-15 of carbon numbers 2-12 - (n4) the poly isocyanate [0018] As an example of aliphatic series poly isocyanate (n1), ethylene di-isocyanate, tetramethylene di-isocyanate, hexamethylene di-isocyanate (HDI), dodeca methylene di-isocyanate, 2 and 2, 4-trimethyl hexamethylene di-isocyanate, lysine diisocyanate, 1 and 3, 6-hexamethylene tri-isocyanate, etc. are mentioned. As an example of alicyclic poly isocyanate (n2), isophorone diisocyanate (IPDI), dicyclohexyl methane -4, 4'-diisocyanate (hydrogenation MDI), 1, 4-cyclohexane diisocyanate, methylcyclohexane -2, 4-diisocyanate (hydrogenation TDI), 1, and 4-screw (2 isocyanate ethyl) cyclohexane etc. is mentioned.

[0019] as the example of aromatic series poly isocyanate (n4) — 1, 4-phenylene diisocyanate, 2, and 4- or 2,6-toluene diisocyanate (TDI), diphenylmethane -2, 4'-, or 4 and 4 - diisocyanate (MDI), naphthalene -1, 5-diisocyanate, and '3, 3' - dimethyl diphenylmethane -4 and 4' - diisocyanate, poor quality TDI, polyphenyl methane poly isocyanate, etc. are mentioned. As an example of aroma aliphatic series poly isocyanate (n3), p-xylylene diisocyanate, tetramethyl xylene G SOSHINETO, etc. are mentioned.

[0020] (n1) Instead of the isocyanate radical of the poly isocyanate illustrated above as - (n1) (n4) as an example of the denaturation object (n5) of the poly isocyanate of - (n4), the denaturation object which introduced a carbon amide group, a URECHI dione radical, a URETO imino group, the urea radical, the view ITTO radical, the isocyanurate radical, the urethane group, etc. is mentioned. There is especially no limitation in selection of these organic poly isocyanate compound (n), and it can double with the physical properties according to an operating condition and a part, and can be chosen as arbitration.

[0021] As the above-mentioned active hydrogen content compound (h), following (h1) - (h12) is mentioned, for example.

(h1) An aliphatic series dihydric alcohol (h2) annular radical The low-molecular diols which it has Trihydric alcohol (h3) The polyhydric alcohol of four or more organic functions (h4)

Alkanolamines (h5) The ethyleneoxide of the compound of - (h5) (h6) (h1) And/ Or low mol addition product (h7) polyoxyalkylene polyol (h8) polyester polyol (h9) polyolefine polyol (h10) acrylic polyol (h11) castor oil system polyol (h12) polymer polyol [0022] of propylene oxide What was obtained by acrylic nitril, styrene, etc. carrying out the polymerization of the ethylenic unsaturated monomer of a publication to U.S. Pat. No. 3383351 in the amount polyol of giant molecules illustrated to - (h7) (h11) as polymer polyol here is mentioned. Moreover, - (h12) may be used by the above (h1) and independent, and an active hydrogen content compound (h) may combine it suitably.

[0023] In this invention, the NCO content in the above-mentioned prepolymer (c) is 0.5 - 30 % of the weight preferably. Moreover, an urethane prepolymer (c) is liquefied in ordinary temperature, and 1,000-50,000 are [molecular weight] desirable. This prepolymer (c) mixes for example, the organic poly isocyanate (n) and an active hydrogen inclusion (h), and is manufactured by making it react at 50-120 degrees C.

[0024] The loadings of the urethane prepolymer in the foam of this invention (c) have 5 - 20 desirable % of the weight to the solid content of the foaming agent (b) of the above-mentioned phosphoric acids (a) and phosphoric acids. At less than 5 % of the weight, foam is too weak to use it, and if 20 % of the weight is exceeded, the fire-resistant engine performance will become inadequate. In order that it may give still higher fire retardancy, it may foam to a flame retarder and may make a component add and harden it, although the foam of this invention can give quite high fire retardancy if the loadings of the above (c) are made into the desirable range.

[0025] As a flame retarder, non-halogen phosphoric ester, halogen content phosphoric ester, an active hydrogen content flame retarder, an antimony trioxide, antimony pentoxide, and a zinc oxide are mentioned, and a kind or two sorts or more may be used. The amount of the flame retarder used is usually below 40 weight sections to the (Prepolymer c) 100 weight section.

[0026] In this invention, the foam which contained the fire-resistant component very so much can be obtained by foaming for the component which consists of water the foaming agent (b) of phosphoric acids (a) and phosphoric acids, an urethane prepolymer (c), and if needed, and mixing and stiffening it. Moreover, a catalyst may be added in order to control the cure rate of the above-mentioned prepolymer (c) by this invention.

[0027] As a catalyst, dibutyltin dilaurate, an alkyl titanate, an organic silicon titanate, Stannous octoate, lead octylate, octylic acid zinc, an octylic acid bismuth, A dibutyl tin JIORUSO phenyl FENOKI site, tin oxide, and metal system catalysts, such as a resultant of ester compounds (dioctyl phthalate etc.), Monoamines and diamines (triethylamine etc.) (N, N, N', N'-tetramethylethylenediamine, etc.) Amines (triethylenediamine etc.) system catalysts, such as triamine (N, N, n', n''-pentamethyl diethylenetriamine, etc.) and annular amines, etc. are mentioned.

[0028] A catalyst may use together a metal system and an amine system independent or a metal system, and an amine system. The loadings of a catalyst are usually 0.001 - 5 weight section preferably below 10 weight sections to the (Prepolymer c) 100 weight section.

[0029] In this invention, in order to control the cellular structure of foam, a foam stabilizer may be added. The silicon system surfactant of the conventional known is mentioned as a foam stabilizer, and the addition is usually 0.001 - 1 weight section preferably below 3 weight sections to this prepolymer 100 weight section.

[0030] When the front face was hydrophobicity, it was sufficient for the hydrophobic particle used in this invention, even if the interior is a hydrophilic property, the hydrophobic ingredient has covered the front face, consequently a front face may show hydrophobicity. Since the water repellence over fine waterdrop will fall if a contact angle will become small if it becomes small, and it becomes large, the mean particle diameter of a hydrophobic particle is limited to 1nm - 1mm. The particle which a contact angle with water becomes from the base material which is 90 degrees or more as a desirable example of the above-mentioned particle, the particle which has a low-grade alkyl group etc. on a front face are mentioned. As a base material whose contact angle with the above-mentioned water is 90 degrees or more, polyethylene, polypropylene, and graphite fluoride, fluorine-containing resin, the ORGANO siloxane, etc. are mentioned, for example.

[0031] As the above-mentioned fluorine-containing resin, for example Tetrafluoroethylene, hexafluoropropylene, Perfluoro vinyl ether, the perfluoro allyl compound ether (perfluoro methyl ether etc.), the homopolymer (polytetrafluoroethylene —) of fluorine content polymerization nature monomers, such as a perfluoro propylene and vinylidene fluoride a PORUBINIRIDEN full ora — those copolymers (a poly vinylidene fluoride-polytetrafluoroethylene-perfluoro propylene copolymer —), such as id the parts, such as a vinylidene fluoride-hexafluoropropylene-tetrafluoroethylene copolymer, — denaturation articles (ethylene or a propylene denaturation article of said polymer etc.) etc. are mentioned.

[0032] If the contact angle of the above-mentioned base material and water becomes small, since the direction of the force which gets wet from the water-repellent force and is going to enlarge a front face becomes large and water repellence will not improve, the contact angle with water has desirable 90 degrees or more. The hydrophobic silica particle which a methyl group and the inorganic or organic particle which, in addition to this, has alkyl group or alkyl group fluoride are mentioned, for example to a front face, and has low-grade alkyl groups, such as a methyl group and an ethyl group, especially on a front face as a particle which has a low-grade alkyl group etc. on the above-mentioned front face is suitable.

[0033] As the above-mentioned hydrophobic silica particle, it is AEROSIL, for example. R972D (Japanese Aerosil), Nipsil SS-50 and Nipsil As for what is generally marketed, SS-30S (Japanese silica industrial company) etc. are usable. The above-mentioned particle may be used independently and may be used together two or more sorts.

[0034] The amount in which the above-mentioned particle is held on the front face of the above-mentioned foam is 0.3 g/m² - 20 g/m². It is carried out. 0.3 g/m² It is because absorption-of-sound nature will worsen if sufficient water repellence cannot be acquired if few, but 20 g/m² is exceeded.

[0035] The epidermis of the foam which foamed into the aquosity mixture which consists of an urethane prepolymer (c) which has the foaming agent (b) and isocyanate radical of phosphoric acids (a) and phosphoric acids as the manufacture approach of the fire-resistant hydrofuge absorption-of-sound object of this invention, was made to harden it, and was obtained is removed, and the approach of sprinkling the above-mentioned particle on said foam is mentioned. Here, the reason for removing epidermis is that an acoustic absorptivity will serve as foam which does not become high if epidermis exists. Furthermore, as the manufacture approach of the fire-resistant hydrofuge absorption-of-sound object of this invention, epidermis is removed after foaming of the above-mentioned aquosity mixture, and before hardening, and the approach of sprinkling the above-mentioned particle is shown in the front face of the obtained foam.

[0036] Even if epidermis is formed and the foam which foamed into the above-mentioned aquosity mixture, was made to harden it, and was obtained usually removes this epidermis, the adhesive strength of that exposure does not change, but if epidermis is removed before hardening, the foam which has an adhesive property in an exposure will be obtained. Namely, in this invention, as for the above "hardening", the interior of foam shall say the phase where the reaction by each raw material advanced to extent which does not have adhesive strength substantially. In the phase of initial foaming, even if epidermis is formed, the interior of foam has an adhesive property and may not have resulted in "hardening."

[0037] If epidermis is removed after foaming of the above-mentioned aqueous mixture, and before hardening, since the high urethane prepolymer of adhesive strength exists in a front face, foam with more high the adhesive strength and holding power of a particle and foam is obtained, and it is convenient.

[0038] The typical sectional view of the fire-resistant hydrofuge absorption-of-sound object according to claim 1 acquired by the manufacture approach according to claim 4 by drawing 1 is shown. 1 is a hydrophobic particle with a mean particle diameter of 1nm - 1mm, and after 2 foams into the aqueous mixture which comes to contain the urethane prepolymer (c) which has the foaming agent (b) and isocyanate radical of the above-mentioned phosphoric acids (a) and phosphoric acids and stiffens it, it is urethane system foam of the open cell structure which removed epidermis and was acquired. urethane system foam 2 -- combination of the above-mentioned indispensable raw material (a), (b), and (c) -- suitably -- ** -- since it has open cell structure and the amount maintenance of specification of the hydrophobic above-mentioned particle is carried out on the front face by carrying out, it has fire retardancy, water repellence, and absorption-of-sound nature.

[0039] The fire-resistant hydrofuge absorption-of-sound object of this invention can also be manufactured by sprinkling the above-mentioned particle in the process paper, foaming into the aqueous mixture which comes to contain the urethane prepolymer (c) which has the foaming agent (b) and isocyanate radical of phosphoric acids (a) and phosphoric acids, and on the other hand, carrying and stiffening it on it.

[0040] Although, as for this, the top face of foam can do epidermis by foam breaking and the Ayr omission, since the Ayr omission is prevented in process paper, the inferior surface of tongue uses that epidermis is not made. In addition, after an unreacted urethane prepolymer and the above-mentioned particle contact, the foam of high this invention of holding power to a particle is obtained by foaming and hardening. If the process paper in this invention is a thing on the sheet which can release foam from mold, there is especially no constraint of the quality of the material, and it can choose suitably paper, a nonwoven fabric, plastic film, a metal plate, etc.

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OPERATION

(Operation) Since the fire-resistant hydrofuge absorption-of-sound object of this invention has the absorption-of-sound nature originating in an open cell and is carrying out the amount maintenance of specification of the hydrophobic specific particle while it is fire retardancy, since the aqueous mixture which comes to contain the urethane prepolymer (c) which has the foaming agent (b) and isocyanate radical of the above-mentioned phosphoric acids (a) and phosphoric acids foams and hardens and is obtained, it also has water repellence.

[0042] According to the approach according to claim 4 of removing the epidermis of the foam which foamed into the above-mentioned aqueous mixture, was made to harden it, and was obtained especially, and sprinkling the particle of the hydrophobic diameter of specification on the amount foam of specification While obtaining high absorption-of-sound nature by removing the epidermis of foam, offer of the foam which forming the detailed irregularity by the particle in the surface of foam and the hydrophobicity of the particle equipped with the water repellence like the leaf of a lotus conjointly is possible.

[0043] Furthermore, according to the approach according to claim 4 of removing epidermis after foaming of the above-mentioned aqueous mixture, and before hardening, and sprinkling the above-mentioned particle on the front face of the obtained foam, a particle can manufacture the fire-resistant hydrofuge absorption-of-sound object held by higher holding power.

[0044]

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EXAMPLE

[Example] (Example 1) 90 degrees C of polyoxyethylene polyoxypropylene glycol (molecular-weight 2188, 20 % of the weight [of ethyleneoxides] and 80 % of the weight [of pro KIREN oxide] block-copolymer, Sanyo Chemical Industries (stock) make, trade name:new pole PE-62) 420 weight sections were made to react for 5 hours to the MDI(BASF make: trade name RUPURANETO MI) 100 weight section using a reaction vessel, and the urethane prepolymer C1 was created. The isocyanate radical content was number average molecular weight 1345 6.2% of the weight.

[0045] Next, after agitating the phosphoric-acid 890 section and the tap water 836 section to homogeneity using a homomixer, the urethane prepolymer C1,100 weight section was supplied to the same homomixer, and was agitated well. Next, the basic-magnesium-carbonate 175 section was added as a foaming agent, and it agitated further, and it slushes into shuttering (15x15x10cm), free foaming was carried out, and foam was obtained. 1cm of epidermis parts of this foam was cut, and 0.06 g (equivalent to 2.67 g/m²) hydrophobic Aerosil (product R972 made from Japanese Aerosil) was sprinkled to homogeneity on it.

[0046] Water repellence trickled waterdrop into foam and viewing estimated whether waterdrop would roll and fall. Acoustic wave absorptivity ability is JIS. The normal incidence sound absorption coefficient (2000HZ) of A1405 estimated. About fire-resistant evaluation, it carried out based on the surface test method specified by the Ministry of Construction notification No. 1231. The result was shown in Table 1.

[0047] (Example 2) After agitating the phosphoric-acid 890 section and the tap water 836 section to homogeneity using a homomixer, it was easy to supply the urethane prepolymer C1,100 weight section created in the example 1 to the same homomixer, and it was agitated. Next, the basic-magnesium-carbonate 175 section was added as a foaming agent, and it agitated further, and slushed into shuttering (15x15x10cm), and 1cm of epidermis parts of this foam was cut in the place which initial foaming completed (after about 30 seconds). Then, 0.06 g (equivalent to 2.67 g/m²) hydrophobic Aerosil (product R972 made from Japanese Aerosil) was sprinkled to homogeneity on it.

[0048] Water repellence trickled waterdrop into foam and viewing estimated whether waterdrop would roll and fall. Acoustic wave absorptivity ability is JIS. The normal incidence sound absorption coefficient (2000HZ) of A1405 estimated. About fire-resistant evaluation, it carried out based on the surface test method specified by the Ministry of Construction notification No. 1231. A result is shown in Table 1.

[0049] (Example 3) After agitating the phosphoric-acid 890 section and the tap water 836 section to homogeneity using a homomixer, it is easy to supply the urethane prepolymer C1,100 weight section created in the example 1 to the same homomixer, and it is agitated. Next, this foaming agent basic-magnesium-carbonate 175 section was added, and it agitated further, and it free-foamed, the release paper (30x30cm) which sprinkled 0.12 g (equivalent to 2.67 g/m²) hydrophobic Aerosil (product R972 made from Japanese Aerosil) to homogeneity at the pars basilaris ossis occipitalis was stiffened [it flowed down and], and foam was obtained.

[0050] Water repellence trickled waterdrop into foam and viewing estimated whether waterdrop would roll and fall. Acoustic wave absorptivity ability is JIS. The normal incidence sound

absorption coefficient (2000HZ) of A1405 estimated. About fire-resistant evaluation, it carried out based on the surface test method specified by the Ministry of Construction notification No. 1231. A result is shown in Table 1.

[0051] (Example 1 of a comparison) After agitating the phosphoric-acid 890 section and the tap water 836 section to homogeneity using a homomixer, it is easy to supply the urethane prepolymer C1,100 weight section created in the example 1 to the same homomixer, and it is agitated. Next, this foaming agent basic-magnesium-carbonate 175 section was added, and it agitated further, and it slushes into shuttering (15x15x10cm), free foaming was carried out, and foam was obtained. The epidermis part of this foam was cut 1cm, and the same evaluation as an example 1 was performed.

[0052] (Example 2 of a comparison) After agitating the phosphoric-acid 890 section and the tap water 836 section to homogeneity using a homomixer, it is easy to supply the urethane prepolymer C1,100 weight section created in the example 1 to the same homomixer, and it is agitated. Next, this foaming agent basic-magnesium-carbonate 175 section was added, and it agitated further, and slushed into shuttering (15x15x10cm), and 1cm of epidermis parts of this foam was cut, and 0.6 g (equivalent to 26.6 g/m²) hydrophobic Aerosil (product R972 made from Japanese Aerosil) was sprinkled to homogeneity on it in the place which initial foaming completed (after about 30 seconds).

[0053] Water repellence trickled waterdrop into foam and viewing estimated whether waterdrop would roll and fall. Acoustic wave absorptivity ability is JIS. The normal incidence sound absorption coefficient (2000HZ) of A1405 estimated. About fire-resistant evaluation, it carried out based on the surface test method specified by the Ministry of Construction notification No. 1231. A result is shown in Table 1.

[0054] (Example 3 of a comparison) After agitating the phosphoric-acid 890 section and the tap water 836 section to homogeneity using a homomixer, it is easy to supply the urethane prepolymer C1,100 weight section created in the example 1 to the same homomixer, and it is agitated. Next, this foaming agent basic-magnesium-carbonate 175 section was added, and it agitated further, and slushed into shuttering (15x15x10cm), and 1cm of epidermis parts of this foam was cut, and 0.005 g (equivalent to 0.2g/m²) hydrophobic Aerosil (product R972 made from Japanese Aerosil) was sprinkled to homogeneity on it in the place which initial foaming completed (after about 30 seconds).

[0055] Water repellence trickled waterdrop into foam and viewing estimated whether waterdrop would roll and fall. Acoustic wave absorptivity ability is JIS. The normal incidence sound absorption coefficient (2000HZ) of A1405 estimated. About fire-resistant evaluation, it carried out based on the surface test method specified by the Ministry of Construction notification No. 1231. A result is shown in Table 1.

[0056]

[Table 1]

	撥水性*	難燃性	吸音率(2000HZ)
実施例1	○	準不燃	0.8
実施例2	○	準不燃	0.8
実施例3	○	準不燃	0.8
比較例1	×	準不燃	0.8
比較例2	○	準不燃	0.68
比較例3	△	準不燃	0.8

*○は転がり落ちたことを示す。

△は少し水滴をはじくが転がり落ちなかったことを示す。

×は発泡体に水滴が吸収されたことを示す。

[Translation done.]

*** NOTICES ***

JPO and NCIPi are not responsible for any damages caused by the use of this translation.

1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.*** shows the word which can not be translated.

3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the typical sectional view of the fire-resistant hydrofuge absorption-of-sound object according to claim 1 acquired by the manufacture approach of this invention according to claim 4.

[Drawing 2] It is the typical sectional view of the water-repellent foam assumed from the conventional technique.

[Description of Notations]

1 Hydrophobic Particle

2 Urethane System Foam of Open Cell Structure

3 Inorganic Organic Compound Foam of Open Cell Structure

4 Nonwoven Fabric

[Translation done.]

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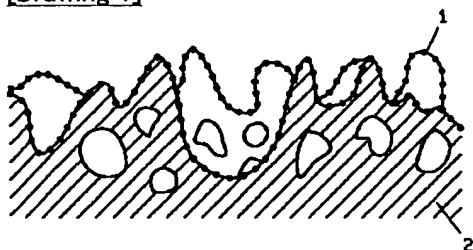
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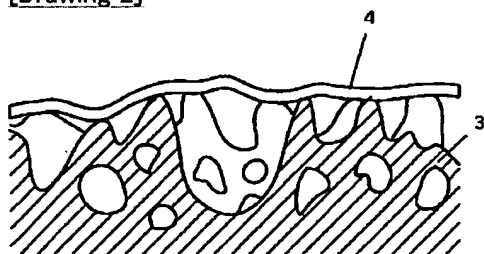
3.In the drawings, any words are not translated.

DRAWINGS

[Drawing 1]



[Drawing 2]



[Translation done.]